1869MNRAS..29...36H

Note on Mr. De La Rue's paper " On some attempts to render the luminous prominences visible without the use of the Spectroscope." By William Huggins, Esq.

Mr. De La Rue puts the following question, " The proposal of Huggins to combine the employment of the spectroscope with the use of absorbing media naturally suggests the question,—why use the spectroscope at all ?"

The suggestion contained in this question was one of the methods by which I originally attempted to render the red flames visible. Some three or four years since, almost at the same time that the method of reducing the scattered light of our atmosphere by the use of dispersion occurred to me, the method by absorption also presented itself to me as a very feasible plan. I made many attempts, not only with the spectroscope, but also with variously combined coloured media without the spectroscope. The latter plan, namely, by absorption, appeared to me to be peculiarly desirable, if it could be accomplished, as it would enable the observer to see the forms of the prominences, and also the whole disk of the Sun at once. It could be applied to any telescope, or used with an opera-glass, or even with the naked eye.

I referred to this method in the report of my Observatory, *Monthly Notices*, vol. xxviii. p. 88. Subsequently, when the Indian observations had confirmed my suspicion that the prominences would give bright lines, and also shown their position in the spectrum, I gave in a short Note an account of this possible method of viewing the solar prominences: (*Monthly Notices*, vol. xxix. p. 4.) The method is also described in my paper in the *Phil. Trans.* 1868, p. 551.

This method was also independently suggested by Lieut. John Herschel in September, 1868: (*Monthly Notices*, vol. xxix. p. 5.)

During the early part of the present year I tried a large number of coloured media. The difficulty is to combine two media which shall absorb light of all refrangibilities except precisely that of the line C or the line F. If even a small range of refrangibility besides that of the line selected, say C, be allowed to pass, the scattered light of the atmosphere overpowers and eclipses the prominences.

The most promising media of those which I tried, were a solution of carmine in ammonia, which cuts off very nearly all the light more refrangible than C, combined with a solution of chlorophyll, which gives a strong band of absorption, taking away the brighter part of the light less refrangible than C. Unfortunately, however, the chlorophyll band encroaches a little upon C, and so weakens the light of the prominences. The absorption of chlorophyll, as Prof. Stokes has shown, can be moved a little in the spectrum by acids and alkalies, and differs slightly in different plants; but I have not been able to degrade the band sufficiently to allow light of the refrangibility of C to pass wholly unimpeded.

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The proposal stated by Mr. De La Rue of combining the employment of the spectroscope with the use of absorbing media, refers probably to a method I proposed for rendering the *forms* of the prominences visible in the spectroscope. In a Note to the Royal Society, *Proceedings*, vol. xvii. p. 302, I showed that by using a wide slit, the forms of the prominences could be seen directly; and I then proposed using a deep red glass before the eye-piece of the spectroscope for the purpose of relieving the eye from the glare, which, under some circumstances, is painful, when a wide slit is employed.

On Spectroscopic Observations of the Transit of Venus in 1874.

By R. A. Proctor, B.A.

At the last Meeting of this Society it was mentioned that the American observers had suggested that spectroscopy should be applied to the observation of the approaching transits of *Venus*. It had been noticed during the total eclipse of last August that the approach of the Moon to the Sun's disk was rendered sensible before the actual commencement of the eclipse by the obliteration of the bright lines of the chromosphere; and the American astronomers suggest that the same might be the case when *Venus* is approaching the Sun's disk in 1874.

I think Mr. Huggins gave a practical character to this suggestion by pointing out that, although there would be difficulties in the method, applied merely to determine the motion of *Venus* over the chromosphere, yet that, as giving a means of preparing the observer for the occurrence of external contact, the method would perhaps be valuable. It is clear that this is, in fact, the only sort of observation which would have any value, since the chromosphere is not an envelope of uniform depth, and *Venus*, as seen from different parts of the Earth's surface, would appear to cross different parts of the chromosphere.

There is a further objection which I pointed out at the last Meeting in the fact that *Venus* approaches the Sun's limb not at a right, but at an exceedingly acute, angle, and that, as we do not know certainly the point of contact, we cannot tell the angle at which *Venus* will cross the limb.

Further, the stations best suited for observing internal contacts are not all suited for the particular mode of observation proposed by the American astronomers. At Crozet Island, for example, where internal contact most retarded can be most favourably seen, the Sun will be close to the horizon when *Venus* is traversing the chromosphere.

Passing over this last objection, which applies equally to egress and to ingress, it will be clear that Mr. Huggins' excellent suggestion that the passage of *Venus* over the chromosphere can be made the means of determining with extreme exactitude, the moment of external contact, can be applied satisfactorily to ob-

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